

ANTICOMPLEMENTARY REACTIONS IN SYPHILIS*

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In his recent article Lighter (1953) demonstrated that sera from patients suffering from congenital syphilis were responsible for anticomplementary reactions about seven times more often than would be expected were anticomplementary reactions distributed evenly among sera from patients with congenital syphilis and those with acquired syphilis.

A similar observation has also been made in our laboratory during the last few years, and this has led us to carry out an investigation of the possible causes of this increased frequency of anticomplementary reactions in sera from patients with congenital syphilis.

In the original observation it was noted that a number of anticomplementary sera also reacted with a syphilis flocculation test. Out of a total of 393 sera from patients diagnosed as suffering from syphilis, 36 were anticomplementary. These sera were tested by a modified Kolmer complement-fixation test (Rappaport and Stark, 1953) and also by the following flocculation tests: Kahn, Meinicke, Rapid T (Rappaport and Eichhorn, 1950), and cardiolipin (Rappaport and Eichhorn, 1951). Of the 36 anticomplementary sera, fourteen were found to react positively with all four flocculation tests, twelve with three of these tests, seven with two of the tests, and three with one test. Most of the positive sera were detected by the Rapid T method (Table). Some of these "anticomplementary" sera proved to be from patients suffering from primary untreated syphilis or congenital syphilis.

In an attempt to discover the reason of the anticomplementary reactions the following experiment was set up: various syphilitic sera were tested by a modified Kolmer complement-fixation test, but instead of one control tube of serum with 2 units complement, two tubes were used, the second containing only 1.5 units complement. With some sera

TABLE
REACTIVITY OF SYPHILITIC ANTICOMPLEMENTARY SERA
BY FOUR FLOCCULATION TESTS

Test				No. of Sera
Cardiolipin*	Meinicke	Kahn	Rapid T†	
+	+	+	+	14
+	+	-	+	7
+	-	+	+	5
+	-	-	+	3
-	-	+	+	2
-	+	-	+	1
+	-	+	-	1
-	+	-	-	2
-	-	+	-	1

* Rappaport and Eichhorn (1951).

† — (1950).

the control tube with 2 units complement showed haemolysis while that with 1.5 units showed none. In syphilitic sera from patients with no history of recent infection, both control tubes showed haemolysis, indicating that even 1.5 units complement were sufficient for the proper functioning of the haemolytic system. In cases in which this smaller quantity of complement was insufficient and no haemolysis occurred in the control tube, one could assume that the complement was either destroyed by the serum or fixed by some component of the serum.

The analysis of these cases made it apparent that such anticomplementary reactions in the tube with the smaller dose were associated with recent infections or congenital syphilis. It could, therefore, be inferred that the agent which removed the complement in the control tube was actually fixed by syphilitic antigen, or by a substance which behaved serologically like syphilitic antigen, the presence of this antigen in the serum causing it to be anticomplementary.

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It is well known that soon after bacterial or viral infections antigen appears in the circulatory system and stimulates the production of antibodies. In the carrier state also there is a continuous production of antigen. In convalescence the antigen disappears, but the antibodies remain and account for certain serological and immunological reactions.

A similar situation may be postulated in syphilis : in the acute stage antigen circulates together with antibodies in the blood ; when this " acute " serum is mixed in the control tube with a small quantity of complement, the antigen binds it and prevents the subsequent haemolysis of the haemolytic system. When more complement is used, enough of it may remain after fixation by the " native " antigen. to react in the control haemolytic system. In cases of treated or cured syphilis, antigen is no longer present in the blood, and even 1.5 units complement in the serum control tube suffice to produce haemolysis.

In sera known to be syphilitic which are at the same time anticomplementary, the amount of cir-

culating antigen is most probably high enough to fix all the complement added to the control tubes. This explanation would fit both our data and those presented by Lighter (1953).

The quantities of complement in the control tubes of anticomplementary sera might be so adjusted that there would be enough to fix the " native " antigen and the haemolytic system, while, in the test proper, all the complement would be fixed by both the " native " and the added antigen. One has to bear in mind, however, that non-syphilitic antigens might be circulating in the blood which would bind complement in the control tube. In doubtful cases, therefore, where an anticomplementary reaction is observed, one has to rely on flocculation tests for a serological diagnosis.

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